ST. LOUIS (EX) ARMY AMMUNITION PLANT
SAMPLING AND ANALYSIS PLAN

PART II

QUALITY ASSURANCE PROJECT PLAN

REVISION 0

Submitted to:

U. S. Environmental Protection Agency
Region 7
Superfund Division
Federal Facilities and Special Emphasis Branch
901 North 5th Street
Kansas City, Kansas 66101

Submitted by:

TechLaw, Inc.
6901 West 63rd Street, Suite 407
Overland Park, Kansas 66202

Work Assignment No.:	07-YX
Contract No.:	68-W-01-051
Date Prepared:	August 13, 2002
Prepared By:	TechLaw, Inc. Steve Bryant (913) 236-0006 extension 108
TechLaw Project No.:	RR7-K07
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Title: St. Louis (ex) Army Ammunition Plant
Quality Assurance Project Plan, Revision 0

Date: August 13, 2002

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Submitted To:
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Approvals:

_____ _____
Thomas Lorenz, EPA Work Assignment Manager Date

_____ _____
Ernie Arnold, EPA Regional Quality Assurance Manager Date

_____ _____
Steve Bryant, TechLaw Work Assignment Manager Date

_____ _____
Mike Tindle, TechLaw Quality Assurance Officer Date

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A PROJECT MANAGEMENT

A3 Distribution List

Distribution List

The following EPA Region 7 personnel and personnel from TechLaw, Inc. (TechLaw) will receive copies of the approved Quality Assurance Project Plan (QAPP) and any addendums.

- EPA Region 7
  Thomas Lorenz, Work Assignment Manager
  Ernie Arnold, Regional Quality Assurance Manager
  Bob Dona, Superfund Quality Assurance Coordinator

EPA Region 7 Environmental Services Division (ENSV) Laboratory will be the analytical laboratory for this project.

- **TechLaw**
  Steve Bryant, Work Assignment Manager
  Keith Slider, Environmental Scientist
  Mike Tindle, TechLaw Quality Assurance Officer
  Terry Uecker, TechLaw Project Quality Assurance Coordinator

A4 Project/Task Organization

The various quality assurance, field, laboratory and management responsibilities of key project personnel are defined below. The lines of authority specific to this investigation are presented in Figure A4. At the direction of the EPA WAM, TechLaw has responsibility for all phases of the investigation. TechLaw will perform project management, conduct the field investigation, and prepare the Sampling and Analysis Reports.

Thomas Lorenz, EPA Work Assignment Manager
Mr. Thomas Lorenz, the EPA Work Assignment Manager (WAM), has the overall responsibility for all phases of the investigation. Mr. Lorenz is the primary decision-maker and the primary user of results generated under the Field Sampling Plan (FSP)

and the QAPP. Mr. Lorenz is responsible for reviewing and approving the FSP and the QAPP, and all revisions, in terms of project scope and objectives.

Ernie Arnold, EPA Regional Quality Assurance Manager
Mr. Ernie Arnold, the EPA Regional Quality Assurance Manager, is responsible for review and approval of the QAPP in terms of quality assurance.

Bob Dona, EPA Superfund Quality Assurance Coordinator
Mr. Bob Dona, the EPA Superfund Quality Assurance Coordinator (QAC), is responsible for reviewing the FSP, and all revisions, in terms of quality assurance aspects. Specific QA functions and duties include the following:

- Conducting external Performance and System Audits of any analytical laboratory utilized in this project;
- Evaluating results of performance evaluation sample data; and
- Reviewing and evaluating analytical field and laboratory procedures.

Steve Bryant, TechLaw Work Assignment Manager
Mr. Steve Bryant, TechLaw WAM, is responsible for implementing the project, and has the authority to commit the resources necessary to meet project objectives and requirements. The TechLaw WAM's primary function is to ensure that technical, financial, and scheduling objectives are achieved successfully. The TechLaw WAM will report directly to the EPA WAM and will provide the major point-of-contact and control for matters concerning the project. Specific functions and duties include the following:

- Ensure that the TechLaw Field Team Leader and TechLaw Field Team Members are provided a copy of the FSP and QAPP and that all TechLaw field personnel understand the requirements of the FSP and QAPP before sample collection;
- Define project objectives and develop a detailed work plan schedule;
- Establish project policy and procedures to address the specific needs of the project as a whole, as well as the objectives of each task;
- Acquire and apply technical and corporate resources as needed to ensure performance within budget and schedule constraints;
- Monitor and direct the field leaders;
- Develop and meet ongoing project and/or task staffing requirements, including mechanisms to review and evaluate each task product;

- Review the work performed on each task to ensure its quality, responsiveness, and timeliness;
- Review and analyze overall task performance with respect to planned requirements and authorizations;
- Approve all deliverables before their submission to EPA;
- Ultimately be responsible for the preparation and quality of interim and final reports; and
- Represent TechLaw at meetings and public hearings.

Mike Tindle, TechLaw ROC Quality Assurance Officer

Mr. Mike Tindle, TechLaw Regional Oversight Contract (ROC) Quality Assurance Officer (QAO) is responsible for auditing the implementation of the QA program in conformance with the demands of specific investigations, TechLaw policies, and EPA requirements. The TechLaw QAO will remain independent of direct job involvement and day-to-day operations, and have direct access to corporate executive staff, as necessary, to resolve any QA dispute. The TechLaw QAO has sufficient authority to stop work on the investigation, as deemed necessary, in the event of serious quality assurance/quality control (QA/QC) issues. Specific functions, which may be delegated to the TechLaw ROC QAC, include the following:

- Review and approve FSP and QAPP, and all revisions, in terms of quality assurance;
- Reviewing and approving QA plans and procedures;
- Providing QA technical assistance to project staff; and
- Reporting on the adequacy, status, and effectiveness of the QA program on a regular basis to the TechLaw Senior Project Manager and TechLaw ROC Program Manager.

Terry Uecker, TechLaw Project Quality Assurance Coordinator

Mr. Terry Uecker, TechLaw Project QAC, is responsible for reporting and documenting the adequacy, status, and effectiveness of the QA program on a regular basis to the TechLaw QAO. The TechLaw Project QAC has sufficient authority to stop work on the investigation, as deemed necessary, in the event of serious QA and quality control (QC) issues. Specific functions and duties include the following:

- Initial project set-up;
- Performing internal QA audits on various phases of the field operations; and
- Day-to-day QC to ensure adherence to the SAP.

TechLaw Field Manager

TechLaw has anticipated that the sampling will be undertaken by personnel from the TechLaw Overland Park, Kansas office. The TechLaw WAM, Steve Bryant or other appropriate personnel from the TechLaw Overland Park office, will be responsible for leading and coordinating the day-to-day activities of the field sampling personnel in the event that the TechLaw WAM does not perform sampling. Specific TechLaw Field Manager responsibilities include the following:

- Coordinating and managing field staff;
- Identifying problems at the field team level, resolving difficulties in consultation with the TechLaw WAM; and
- Participating in preparation of Sampling and Analysis Reports.

TechLaw Field Technical Staff

In the event that additional field technical staff are required to accomplish the objectives of this project, personnel will be drawn from TechLaw's pool of corporate resources. The technical staff will be utilized to gather and analyze data, and to prepare various task reports and support materials. All of the designated technical team members are experienced professionals who possess the degree of specialization and technical competence required to effectively and efficiently perform the required work.

EPA Region 7 ENSV Laboratory

The laboratory tasked with responsibility for analytical work is EPA Region 7 ENSV. The specific functions and duties are listed below.

- Coordinating laboratory analyses;
- Supervising in-house chain-of-custody;
- Receiving and inspecting the incoming sample containers;
- Recording the condition of the incoming sample containers;
- Signing appropriate documents;
- Verifying chain-of-custody;
- Notifying laboratory manager and laboratory supervisor of sample receipt and inspection;
- Assigning a unique identification number and customer number, and entering each into the sample receiving log;
- Transferring samples to appropriate lab sections;

- Controlling and monitoring access/storage of samples and extracts;
- Scheduling sample analyses;
- Preparation of analytical reports;
- Laboratory QA;
- QA/QC documentation;
- Detailed data review and validation by analyst and senior data reviewer;
- Determining whether to implement laboratory corrective actions, if required;
- Defining appropriate laboratory QA procedures; and
- Preparing laboratory Standard Operating Procedures (SOPs).

A5 Problem Definition/Background

SLAAP is owned by the U.S. Department of the Army and is currently under the command of U.S. Army and Aviation Missile Command (AMCOM). Currently, eight of the original seventeen buildings associated with the 105-mm shell casing production are standing. The eight buildings are currently unoccupied.

The SLAAP site originally encompassed 21 acres of land on the northeastern portion of the St. Louis (ex) Ordnance Plant (SLOP) site. The site is located at 4800 Goodfellow Boulevard in St. Louis, Missouri. The area occupied by SLAAP was formerly owned by General Electric Company/General Electric Realty Corporation from January 1926 to April 1941. The U.S. Army purchased the land in 1941 from General Electric Realty Corporation for the construction of SLOP, which was completed in 1942. SLOP was a 276-acre, small arms ordnance plant that produced 0.30- and 0.50-caliber munitions. In 1944, the northeast portion of SLOP, specifically 21 acres, was designated as SLAAP and converted from small arms munitions production to 105-mm Howitzer shell production. SLAAP was part of SLOP through 1944. Constructed between 1941 and 1942, Buildings 3, 5, 6, and 9 were used for 0.30-caliber munitions production until 1944.

The 21-acre plant was contract-operated by the Chevrolet Shell Division of General Motors Corporation. The Chevrolet Shell Division initiated the production of shells at the property in December 1944, with an accelerated schedule to produce 800,000 shells per month by June 1945. The conversion included altering Building 3 to produce 105-mm Howitzer shells; converting Building 5 to a headquarters and office building; converting Building 6 to additional office space and laboratory building; and converting Building 9 into an Acetylene Generator Building. In addition, Buildings 1, 2, 4, 7, 7A, 8, 8A, 10, 11, 11A, and 11B were constructed in 1944. These buildings were used for the following purposes:

- Building 1 - Billet Cutting Building;
- Building 2 - Forge Building;
- Building 4 - Air Compressor Building;
- Building 7 - Water Pump House;
- Building 7A - Cooling Tower;
- Building 8 - Fuel Storage Area;
- Building 8A - Oil Pump House;
- Building 10 - Quench Oil Storage Tank;
- Building 11 - Foamite Generator Building; and
- Building 11A and 11B - Hose Cart Shelters.

In 1985, portions of Buildings 3, 5, and 6 were converted into office space. The production machinery remained on the property until it was removed in 1989. In 1998, these buildings were vacated.

Several environmental investigations including a site-wide Environmental Baseline Study (EBS) and several removal actions have been conducted at SLAAP. The site-wide EBS was conducted in 2000 to determine the environmental condition of the property, prior to transfer, outgrant, or disposal. Tetra Tech EM, Inc., prepared the site-wide EBS for AMCOM. These activities are discussed below.

Underground Storage Tanks Investigation and Removal

The site-wide EBS indicated that six underground storage tanks (USTs) were installed and used at SLAAP. The six USTs included three steel quench oil tanks; one concrete sludge pit; and two steel gasoline tanks. The quench oil tanks ranged in capacity from 14,000 to 15,000 gallons; the sludge pit had a volume of approximately 10,000 gallons; and the gasoline tanks had capacities of approximately 6,000 and 11,000 gallons. The quench oil tanks were located east of Building 3 and were used to supply oil to the 14 quench tanks used in the production of 105-mm Howitzer shells. The concrete sludge pit was installed next to the quench oil tanks in 1944 and received used quench oil from Building 3. Residue settled out of the used quench oil in the pit before the oil was reused. The 6,000-gallon gasoline UST was used to fuel vehicles and other gasoline-powered equipment at SLAAP with regular (leaded) gasoline. The site-wide EBS stated that in 1969, the contents of the USTs were removed and the quench oil tanks, sludge pit, and 6,000 gallon gasoline tank were filled with water. One additional 10,000-gallon gasoline UST that had been installed west of Building 2 in 1945 was reportedly abandoned in-place in 1959 by filling with sand. The U.S. Army

Corps of Engineers (USACE) performed an investigation and evaluation of USTs in 1989 at SLAAP.

An investigation of the USTs was conducted in 1992 by J.D. Chelan in preparation for their removal. The investigation included sampling of the UST contents, installation of 12 soil borings, and collection of subsurface soil samples. Analysis of the UST contents revealed that each quench oil tank contained mostly water, with 1 to 2 percent oil and sludge material. The sludge pit contained water and approximately 5 percent oil and sludge. The 6,000 gallon gasoline tank was filled almost entirely with water, and the 10,000 gallon gasoline tank contained a mixture of 25 percent water and 75 percent coal-like fines. The liquids in the USTs were analyzed and found to contain no polychlorinated biphenyls (PCBs), while the analysis of the solids revealed low concentrations of metals. Total petroleum hydrocarbons (TPHs) ranged from 11 to 6,530 parts per million (ppm) in the subsurface soil samples. The highest TPH concentrations were detected in samples collected from 13 to 17 feet below ground surface (bgs) around the quench oil tanks. The sample collected near the 6,000 gallon gasoline tank at 7 feet bgs revealed TPHs at a concentration of 491 ppm. The site-wide EBS stated that one surface soil sample collected from a pipe north of the 6,000 gallon gasoline tank contained a red "Solvent-like" material. Analysis of the sample revealed benzene, toluene, ethylbenzene, and xylenes (BTEX) compounds at a concentration of 477,200 ppm. This pipe led from the gasoline UST to the gasoline dispensing pump and is embedded in the structural concrete foundation.

UST removal activities were conducted in 1992. Prior to the removal, approximately 2,300 gallons of the water and oil mixture was pumped from the tanks and transported to an oil recycling facility. The USTs and 1,500 cubic yards of contaminated soil were removed and subsequently disposed. Confirmation samples collected from the excavation indicated that further remedial action was required. An additional 300 cubic yards of contaminated soil was removed and disposed. Closure of the SLAAP UST sites is pending.

Polychlorinated Biphenyls

Oils containing PCBs were used at SLAAP in machining processes. The site-wide EBS identified that the PCB-containing oil, which was called "soluble oil," was used primarily as a coolant in the milling, lathing, and smoothing processes in Building 3. PCBs were also used in hydraulic oils and transformers found throughout the site. The soluble oil was circulated from the soluble oil and mixing room on the first floor of Building 3 to the machinery on the first and second floors by overhead lines. These lines then fed oil through pipe drops to individual machines.

PCBs were first detected at SLAAP in creosote-treated wood flooring blocks that were removed during Building 3 renovation activities in March 1991. The initial sampling was performed by the U.S. General Services Administration (GSA) in April 1991. In May 1991, after additional sampling and analysis of the creosote-treated wood blocks, EPA Region 7 issued a notification of noncompliance (NON) to SLAAP under the authority of the Toxic Substances Control Act (TSCA). From September 1991 through August 1994, Rust Remedial Services, Inc., performed decontamination activities and confirmatory sampling on the first and second floors of Building 3. The corrective action consisted of removal of PCB-contaminated wood blocks, concrete floors, and block walls on the first and second floors of the building. As part of the remedial approach for Building 3, a health-based risk assessment was completed in June 1996 (Woodward Clyde-Consultants) to determine risk-based clean up levels for the basement and the first and second floors of Building 3. The risk assessment conducted by Woodward Clyde-Consultants concluded that the concentrations of contaminants of concern did not present an imminent threat to human health and the environment. The Agency for Toxic Substance and Disease Registry (ATSDR) did not endorse the health-based risk assessment, and the issue of the NON is currently unresolved. EPA will make a final determination upon the completion of the risk assessment and remedial activities conducted by the Army.

Pesticides

Soil and surface wipe samples collected in the basement of Building 3 in June 1994 by Dames & Moore contained pesticides, including 4,4-DDE; 4,4-DDD; 4,4-DDT; dieldrin; endrin; heptachlor epoxide; and gamma-BHC. The origin of the pesticides was not identified in the site-wide EBS. The risk assessment, completed by Woodward Clyde-Consultants in June 1996 for PCBs, included the identified pesticides. The risk assessment concluded that pesticides in the basement of Building 3 do not pose an unacceptable risk.

Asbestos-Containing Materials

An asbestos-containing material (ACM) survey was conducted at SLAAP in June and July 1991 by Plant Facilities and Engineering, Inc. (PFE). Corrugated siding (ACM) was used on Buildings 1, 2, 3, 4, 5 and 6; building crossovers; and the western guard shack. ACM was also found in stock items consisting of packing and gasket material in Building 4 and was identified in the thermal system insulation on abandoned pipelines in Buildings 4A, 7 and the basements of Buildings 3, 5 and 6. The floor tile and mastic in Buildings 3, 5 and 6 contained nonfriable ACM. Both friable and nonfriable ACM were found throughout the buildings at SLAAP. ACM will be addressed under National Emission Standards for

Hazardous Air Pollutants (NESHAP) regulations. ACM in Building 3 will be removed prior to demolition of Building 3. The disposition of ACM in other buildings at SLAAP has not been determined.

Lead-Based Paint

In 1993, a Preliminary Assessment (PA) screening was conducted at Building 3 for lead-based paint (LBP) by U.S. Army Environmental Hygiene Agency (USAEHA) because of the age of the building and as a result of previous sampling conducted in April 1992. The screening report cites a potential human health and environmental threat associated with LBP at the site.

Radon

A radon survey was conducted in the basement of Buildings 3, 5, and 6 by PFE from December 1991 to June 1992. Army Regulation 200-1 requires that mitigation be undertaken if the average annual radon concentration in a structure exceeds 4 picoCuries per liter (pCi/L) of air. The investigation report indicated that radon concentrations in the basement of Buildings 3 and 6 did not exceed 4 pCi/L of air. However, the basement of Building 5 had an overall average radon concentration of 5.29 pCi/L.

A6 Project/Task Description and Schedule

Under Regional Oversight Contract Number 68-W-01-051, TechLaw is currently providing technical assistance to EPA Region 7, Superfund Division, Federal Facilities and Special Emphasis Branch. TechLaw has been tasked with Work Assignment 07-YX to provide technical oversight support to the EPA at the former SLAAP site in St. Louis, Missouri.

Oversight and split sampling activities by TechLaw include the observation, documentation, and reporting of soil, water/oil mixture, and concrete core sampling activities at SLAAP. The EPA WAM, Thomas Lorenz, has directed TechLaw to conduct split sampling at SLAAP to verify the quality of sampling and analysis performed by AMCOM/ USACE contractors related to the site-specific EBS. TechLaw will collect split samples of AMCOM/USACE contractor's samples which must be collected as required by their EPA-approved SAP. The EPA WAM will direct TechLaw in the determination of which samples to split with the potential that split samples will include soil, water/oil mixtures, and concrete core samples. Water/oil mixture samples are to be collected by AMCOM/USACE contractor personnel from selected sewer manholes located on-site by lowering sampling equipment from the

surface to the desired sampling depths. Concrete core samples are to be collected by AMCOM/USACE contractor personnel from the surface of concrete slabs in selected buildings. Subsurface soil sampling will be conducted by AMCOM/USACE contractor personnel throughout the site by the use of direct-push technology or hand auger techniques.

For each split sample, TechLaw will provide AMCOM/USACE contractor personnel with sample containers immediately before sample collection and will document the sample collection procedure. AMCOM/USACE contractor personnel will fill TechLaw's sample containers from the same sample location as the AMCOM/USACE sample, and the TechLaw container will be handed to TechLaw personnel for labeling, sealing and preservation according to Table 2 of the FSP.

The AMCOM/USACE site-specific EBS SAP was developed by URS Group, Inc. (URS), and is being managed and implemented by URS personnel. Currently, URS has not named the analytical laboratory designated to analyze samples collected under the AMCOM/USACE SAP.

Analytical results of split samples obtained by TechLaw will be compared against analytical results obtained by URS, if provided to TechLaw by AMCOM/USACE.

Specific dates of sampling events by TechLaw will be undertaken through the direction of the EPA WAM and are anticipated to occur during the months of August 2002 through September 2002. TechLaw has anticipated that the sampling will be undertaken by personnel from the TechLaw Overland Park, Kansas.

A7 Quality Objectives and Criteria for Measurement Data

The overall QA objective for this project is to develop and implement procedures for field sampling, laboratory analysis, chain-of-custody, and reporting that will provide results which are legally defensible in a court of law. This section provides in greater detail specific data quality objectives (DQOs).

Specific procedures for sampling, chain-of-custody, laboratory instrument calibration, laboratory analysis, reporting of data, internal QC, audits, preventive maintenance of field equipment, and corrective action are described in Sections B and C of this QAPP. Laboratory measurement methods are listed in Table 3 of the FSP. EPA Region 7 ENSV Laboratory will be responsible for performing laboratory instrument calibration, laboratory

analysis, reporting of data, internal laboratory QC, audits, preventive maintenance of laboratory equipment, and analytical corrective action.

A7.1 Precision

Precision is a measure of the degree to which two or more measurements are in agreement.

A7.1.1 Field Precision Objectives

Field precision is assessed through the collection and measurement of field duplicates at a rate of 1 duplicate per 10 analytical samples. The total estimated number of duplicates for this project is provided in the Field Sampling Plan.

A7.1.2 Laboratory Precision Objectives

Precision in the laboratory is assessed through the calculation of relative percent differences (RPD) and relative standard deviations (RSD) for three or more replicate samples.

For inorganic analyses, laboratory precision shall be assessed through the analysis of a sample/sample duplicate pair and field duplicate pairs. For organic analyses, laboratory precision shall be assessed through the analysis of matrix spike/matrix spike duplicates (MS/MSD), field duplicate samples, laboratory blanks, and/or laboratory blank duplicates.

A7.1.3 Precision Assessment

The RPD between the spike and matrix spike, or matrix spike and sample duplicate in the case of metals, and field duplicate pair or laboratory duplicate pair is calculated to compare to precision data quality objectives (DQOs). The precision DQOs for this project range from 20 to 50 percent RPD. The RPD is calculated according to the following formula.

$$RPD = \frac{(\text{Amount in Sample 1} - \text{Amount in Sample 2})}{0.5(\text{Amount is Sample 1} + \text{Amount in Sample 2})} \times 100$$

A7.2 Accuracy

Accuracy is the degree of agreement between an observed value and an accepted reference or true value.

A7.2.1 Field Accuracy Objectives

Accuracy in the field is assessed through the use of field and trip blanks and through the adherence to all sample handling, preservation and holding times.

A7.2.2 Laboratory Accuracy Objectives

Laboratory accuracy is assessed through the analysis of MS/MSD, standard reference materials (SRM), laboratory control samples (LCS) and surrogate compounds, and the determination of percent recoveries. Laboratory accuracy objectives can be found in applicable EPA Region 7 ENSV Laboratory SOPs.

A7.2.3 Accuracy Assessment

In order to assure the accuracy of the analytical procedures, an environmental sample shall be spiked with a known amount of method-specific analytes. At a minimum, one sample spike should be included in every set of 20 samples tested on each instrument, for each sample matrix to be tested. The increase in concentration of the analyte observed in the spiked sample, due to the addition of a known quantity of the analyte, compared to the reported value of the same analyte in the un-spiked sample determines the percent recovery.

Accuracy is similarly assessed by determining percent recoveries for surrogate compounds added to each field and QC sample. Accuracy for the metals analysis will also be further assessed through determination of percent recoveries for LCSs, as well as MS samples. Percent recovery (%R) for MS/MSD results is determined according to the following equation:

$$\%\,R,\ MS/MSD = \frac{(\text{Spiked Sample Amount} - \text{Sample Amount})}{\text{Known amount added}} \times 100$$

Percent recovery for LCS and surrogate compound results is determined according to the following equation:

$$\%\ R,\ LCS = \frac{\text{Experimental Concentration}}{\text{Known amount added}} \times 100$$

A7.3 Completeness

Completeness is a measure of the amount of valid data obtained from a measurement system compared to the amount that was expected to be obtained under normal conditions.

A7.3.1 Field Completeness Objectives

Field completeness is a measure of the amount of valid measurements obtained from all the measurements taken in the project. The field completeness objective for this project will be greater than 90 percent.

A7.3.2 Laboratory Completeness Objectives

Laboratory completeness is a measure of the amount of valid measurements obtained from all the measurements taken in the project. The laboratory completeness objective for this project will be greater than 95 percent.

A7.3.3 Completeness Assessment

Completeness is the ratio of the number of valid sample results to the total number of samples analyzed with a specific matrix and/or analysis. After analytical testing, the percent completeness (% C) will be calculated by the following equation:

$$\%\ C = \frac{\text{(number of valid measurements)}}{\text{(number of measurements planned)}} \times 100$$

A7.4 Representativeness

Representativeness expresses the degree to which data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition within a defined spatial and/or temporal boundary.

A7.4.1 Representativeness of Field Data

Representativeness is dependent upon the proper design of the sampling program and will be satisfied by ensuring that the FSP is followed and that proper sampling techniques are used.

A7.4.2 Representativeness of Laboratory Data

Representativeness in the laboratory is ensured by using the proper analytical procedures, appropriate methods, meeting sample holding times and analyzing and assessing field duplicate samples.

A7.5 Comparability

Comparability is an expression of the confidence with which one data set can be compared to another.

A7.5.1 Comparability of Field Data

Comparability is dependent upon the proper design of the sampling program and will be satisfied by ensuring that the FSP is followed and that proper sampling techniques are used.

A7.5.2 Comparability of Laboratory Data

For this project, split sample results generated by the EPA Region 7 ENSV Laboratory will be compared against results obtained by the AMCOM/USACE laboratory. If split sampling data is not provided by AMCOM/USACE, a split sample comparison will not be undertaken. Split sample results within 25% plus or minus (+/-) the action level established for each media will be compared using RPD. For results within this range, a split sample RPD of $\leq$ 20 to 30 will be considered to be acceptable.

Split sample results outside of 25% +/- the action level established for the media will be compared only to determine if there are any sample collection discrepancies regarding the result obtained by TechLaw comparable to the sample obtained by AMCOM/USACE. All split sample comparisons, review of laboratory data, and

recommendations by TechLaw will be forwarded to the EPA WAM who may request re-sampling.

A7.6 Level of Quality Control Effort

The quality of the data resulting from the field sampling and analytical programs will be assessed through the analysis and evaluation of field blanks, method blanks, field duplicates, laboratory duplicates, laboratory control samples, SRMs, and matrix spike samples. These QC measures will include the following:

- Field blanks consisting of distilled water will be submitted to the analytical laboratories to provide the means to assess the quality of the data resulting from the field sampling program. Field blank samples are analyzed to check for procedural contamination at the facility which may cause sample contamination.
- Method blank samples are generated within the laboratory and used to assess contamination resulting from laboratory procedures;
- Duplicate samples are analyzed to check for sampling and analytical reproducibility; and
- MS/MSDs provide information about the effect of the sample matrix on the digestion and measurement methodology. MS/MSD samples are designated/collected for organic analyses only.

The number of all field QC samples to be collected are provided in TechLaw FSP. The general level of the QC effort will be as follows:

- One field duplicate and one field blank for every 10 or fewer investigative samples; and
- Depending on site-specific circumstances, one MS/MSD for every 20 or fewer investigative samples of a given matrix.

A8 Special Training Requirements/Certifications

All TechLaw field sampling personnel have completed training required under Code of Federal Regulations (CFR) 29 CFR 1910.120. Training is documented in the Overland Park TechLaw office and by the TechLaw Deputy Director of Health and Safety in the Dallas, Texas TechLaw office.

Requirements for specialized training and certifications for laboratory analysis are documented in the EPA Region 7 ENSV Laboratory in Kansas City, Kansas.

A9 Documentation and Records

TechLaw anticipates that preliminary analytical laboratory results will be provided to TechLaw within 30 days of each sampling event with results being forwarded to the EPA WAM as draft data. Data validation will be conducted by the EPA Region 7 ENSV Laboratory. TechLaw anticipates that complete validated data packages will be available within 30 to 45 days of each sampling event. TechLaw will evaluate the analytical data and put into a report format. A Sampling and Analysis Report will be submitted within 10 days of receiving the complete analytical data package from each sampling event. These reports will include the following:

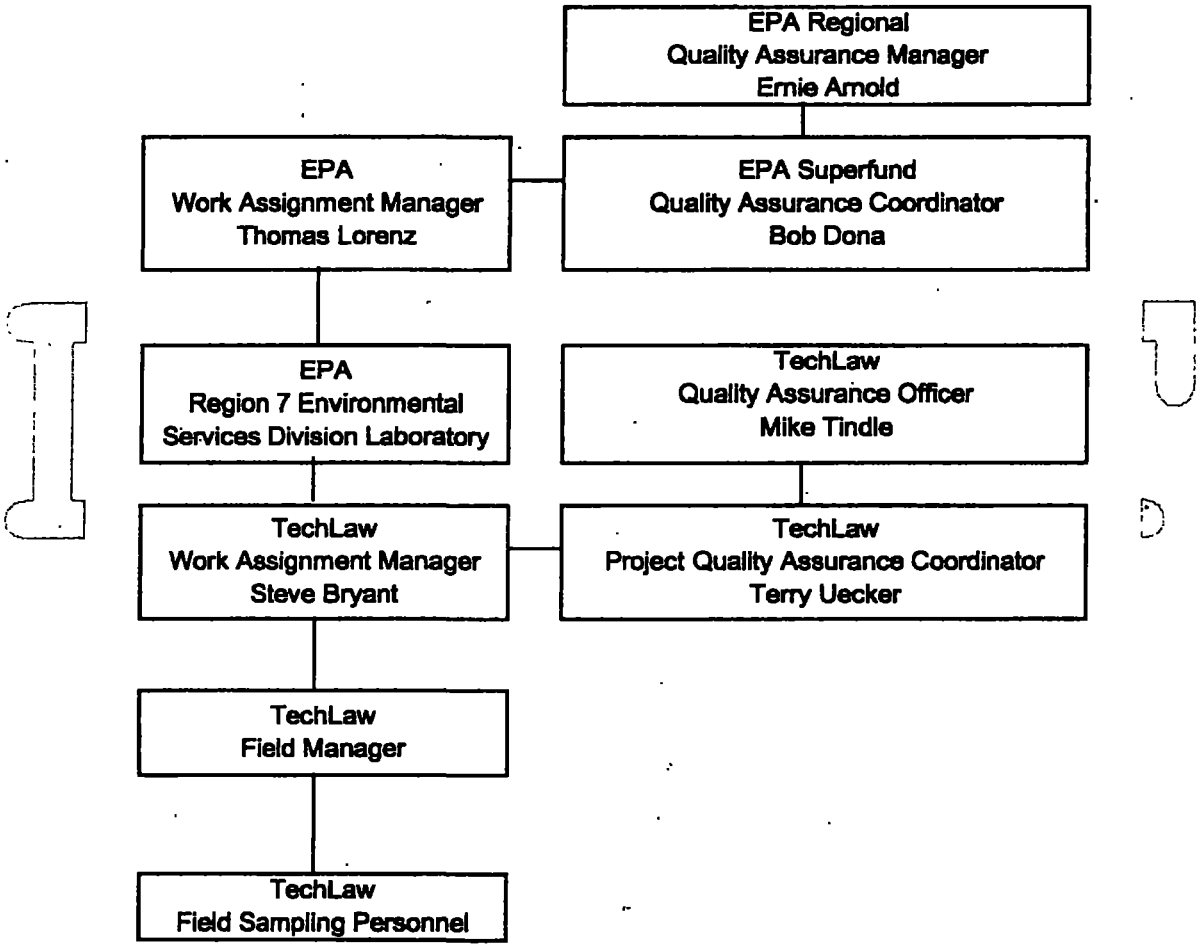
- Summary table of all sampling performed;
- Comparison of analytical results with AMCOM/USACE sample results, if applicable;
- Sample location map;
- Photograph log of all sampling points;
- Quality Assurance section; and
- Photocopies of field logs.

The final evidence file will be the central repository for all documents which constitute evidence relevant to sampling and analysis activities as described in this QAPP. TechLaw is the custodian of the final evidence file and maintains the contents of evidence files for the investigation, including all relevant records, reports, logs, field notebooks, photographs, subcontractor reports and data reviews. The final evidence file will include at a minimum:

- Field logbooks, field data and data deliverables;
- Photographs, drawings;
- Soil boring logs;
- Laboratory data deliverables;
- Data validation reports;
- Data assessment reports;
- Progress reports, including QA reports; and
- All sample custody documentation.

TechLaw will maintain all files in a secured, limited access area within the TechLaw Overland Park office. The TechLaw WAM and the TechLaw Project QAC will maintain the working file during the course of the project. All files will be packaged and transported to the EPA Region 7 offices upon work assignment closeout.

Figure A4
Project Organization Chart



B MEASUREMENT/DATA ACQUISITION

B1 Sampling Process Design

TechLaw will collect split samples of soil, water/oil mixtures, and concrete cores which must be collected as required by the AMCOM/USACE SAP. The EPA WAM will direct TechLaw in the determination of which samples to split.

For each split sample, TechLaw will provide AMCOM/USACE contractor personnel with the appropriate sample containers immediately before sample collection and will document AMCOM/USACE's contractor sample collection procedure. AMCOM/USACE contractor personnel will fill TechLaw's sample containers from the same sample location as the AMCOM/USACE sample, and the TechLaw container will be handed to TechLaw personnel for sealing, labeling, and preservation. Procedures for collecting these samples are provided in the TechLaw FSP.

Samples will be analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), PCBs and polychlorinated dibenzo-p-dioxins/polychlorinated dibenzofurans (PCDD/PCDF), or any combination of these analytes.

TechLaw anticipates a total of three sampling events at the SLAAP site between the months of August 2002 and September 2002, with the total number of sampling events being determined by written direction of the EPA WAM. TechLaw anticipates that the following number of samples will be collected during the course of the project: six soil split samples; six water/oil mixture split samples; six concrete core split samples.

TechLaw anticipates that preliminary analytical laboratory results will be provided to TechLaw within 30 days of each sampling event with results being forwarded to the EPA WAM as draft data. The EPA Region 7 ENSV Laboratory will conduct data validation of the analytical results. TechLaw anticipates that complete validated data packages will be available within 30 to 45 days of each sampling event.

B2 Sampling Methods Requirements

For each split sample, TechLaw will provide AMCOM/USACE contractor personnel with sample containers immediately before sample collection and will document the sample collection procedure. AMCOM/USACE contractor personnel will fill TechLaw's sample containers from the same sample location as the AMCOM/USACE sample, and the TechLaw

container will be handed to TechLaw personnel for labeling, sealing and preservation according to Section B3 of this QAPP.

Sample volumes, containers, preservatives, handling, and maximum holding times to sample extraction and/or analysis for all parameters are presented in Tables 1, 2, and 3 of the FSP. Packing and shipment of samples will be undertaken by TechLaw in the secured on-site AMCOM/USACE sample handling area which is accessed only by personnel from AMCOM/USACE and their contractors, EPA, TechLaw, and the Missouri Department of Natural Resources (MDNR).

Because TechLaw will only be collecting split samples, it is unlikely that any decontamination of sampling equipment will be necessary. However, if decontamination of sampling equipment is undertaken, sampling equipment will be prepared before sample collection and will be decontaminated after sample collection with an Alconox® soap wash, a potable water rinse, and a de-ionized water rinse. The specific SOP for decontamination is provided in the FSP.

If necessary, all decontamination solutions will be collected in a five gallon, plastic bucket for transport to the on-site AMCOM/USACE decontamination pad. TechLaw will notify the EPA WAM for subsequent notification of the AMCOM/USACE when the transport of the decontamination water is to be undertaken.

Personal protective equipment (PPE) used during all sample collection include Tyvek® disposable coveralls, nitrile sampling gloves, disposable boot covers, and paper towels. TechLaw will accumulate all PPE in a plastic trash bag for subsequent transport to the AMCOM/USACE PPE accumulation point. TechLaw will notify the EPA WAM for subsequent notification of the AMCOM/USACE when the transport of PPE is to be undertaken.

Corrective action in the field may be needed when the sample network (e.g., more/less samples, sampling locations other than those specified in the QAPP, among others), sampling procedures and/or field analytical procedures require modification due to unexpected conditions. In general, any TechLaw field sampling personnel may identify the need for corrective action. The field staff in consultation with the TechLaw Field Manager will recommend a corrective action, and the TechLaw WAM and the TechLaw Project QAC may approve the corrective measure which will be implemented by the field team. It will be the responsibility of the TechLaw Field Manager to ensure the corrective action has been implemented. If the corrective action will supplement the existing FSP (i.e., additional split

sampling locations) using existing and approved procedures in the QAPP, corrective action approved by the TechLaw Project QAC will be documented. If corrective actions result in project QA objectives not being achieved (less samples or analytical fractions, alternate locations, among others), it will be necessary that all levels of project management concur with the proposed action, including the EPA WAM and the EPA QAC.

B3 Sample Handling and Custody Requirements

Proper sample handling and custody are necessary for the admissibility of environmental data as evidence in a court of law. Custody procedures help to satisfy the two major requirements for admissibility: relevance and authenticity. A sample or evidence file is under your custody if:

- The item is in actual possession of a person;
- The item is in the view of the person after being in possession of the person;
- The item was in the physical possession but is locked up to prevent tampering; or
- The item is in a designated and identified secure area.

Sample custody is discussed below for field personnel and laboratory personnel. In addition, sample handling for packing and shipping samples is discussed.

B3.1 Field Custody Procedures

Field logbooks will provide the means of recording data-collection activities performed during the investigation. As such, entries will be described in as much detail as possible so that persons going to the facility could reconstruct a particular situation without reliance on memory. Field log books will be bound, field survey books or notebooks. Logbooks will be assigned to field personnel, but will be stored in the document control center when not in use. Each logbook will be identified by the project-specific document number, and the title page of each logbook will contain the following information:

- Person to whom the logbook is assigned;
- Logbook number;
- Project name;
- Site name;
- Project start date; and
- Project end date.

Entries into the logbook will contain a variety of information. At the beginning of each entry, the date, start time, weather, names of all sampling team members present, level of personal protection equipment being used, and the signature of the person making the entry will be entered. The names of visitors to the site, field sampling or investigation team personnel and the purpose of their visit will also be recorded in the field logbook. Measurements made and samples collected will be recorded. All entries will be made in permanent ink, signed, and dated and no erasures will be made. If an incorrect entry is made, the information will be crossed out with a single strike mark which is signed and dated by the sampler.

Whenever a sample is collected, or a measurement is made, a detailed description of the location of the station shall be recorded. The number of the photographs taken of the station, if any, will also be noted. All equipment used to make measurements will be identified, along with the sample number, time of sampling, sample description, depth at which the sample was collected, the volume and number of containers, preservative, and persons collecting the samples. Sample identification numbers will be assigned prior to sample collection. Field duplicate samples, which will receive an entirely separate sample identification number, will be noted under sample description.

The sample packaging and shipment procedures summarized below will ensure that the samples will arrive at the laboratory with the chain-of-custody intact. A flow chart of the field custody procedures is provided in Figure B3.1, and examples of a sample label, sample chain-of-custody, and sample custody seal are provided in Figures B3.3, B3.4, B3.5, respectively.

The field sampler is personally responsible for the care and custody of the samples until they are transferred or properly dispatched. All field personnel will adhere to the following.

- Sample labels must be used for all samples for which chain-of-custody is to be maintained.
- All bottles will be identified by the use of sample tags with sample numbers, sampling locations, date/time of collection, and type of analysis.
- Sample labels will be completed for each sample using waterproof ink unless prohibited by weather conditions.
- Samples will be accompanied by a properly completed chain-of-custody form. The sample numbers and locations will be listed on the chain-of-custody form. When transferring the possession of samples, the individuals relinquishing and receiving will sign, date, and note the time on the record. This record documents transfer of

custody of samples from the sampler to another person, to a mobile laboratory, to the permanent laboratory, or to/from a secure storage area.

- Samples will be properly packaged on ice at 4°Celsius for shipment and dispatched to the appropriate laboratory for analysis, with a separate signed custody record enclosed in and secured to the inside top of each sample box or cooler. Shipping containers will be locked and secured with strapping tape and custody seals for shipment to the laboratory. The custody seals will be attached to the front right and back left of the cooler and covered with clear plastic tape after being signed by the field team leader. The cooler will be strapped shut with strapping tape in at least two locations.
- All shipments will be accompanied by the chain-of-custody record identifying the contents. The original record will accompany the shipment, and copies will be retained by the TechLaw sampler.
- Samples will be sent via overnight express to the analytical laboratory using Federal Express or delivered via courier. Shipment receipts will be retained by TechLaw as part of the permanent documentation. Federal Express will not be required to sign the custody form since the custody forms will be sealed inside the sample cooler and the custody seals will remain intact.

B3.2 Laboratory Custody Procedures

Laboratory custody procedures for sample receiving and log-in; sample storage and numbering; tracking during sample preparation and analysis; and storage of data are available at the EPA Region 7 ENSV Laboratory. TechLaw anticipates that EPA Region 7 ENSV Laboratory will coordinate sample custody, tracking, analysis and data validation. A generalized laboratory chain-of-custody sequence is provided in Figure B3.2.

B4 Analytical Methods Requirements

B4.1 Field Analytical Procedures

At the current time, no field analytical procedures are anticipated for this project. If the EPA WAM directs TechLaw to perform field analytical procedures, the appropriate SOPs will be provided in an addendum to this QAPP and the standardization and QA criteria for the field parameters will be provided.

B4.2 Laboratory Analytical Procedures

Laboratory analytical methods are presented in Table 3 of the FSP. Laboratory analytical measurements will be conducted by the EPA Region 7 ENSV Laboratory in accordance with the procedures detailed in *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, Third Edition* (June 1997) (SW-846).

B5 Quality Control Requirements

B5.1 Field Quality Control Checks

At the current time, no field analytical procedures are anticipated for this project. If the EPA WAM directs TechLaw to perform field analytical procedures, the appropriate SOPs will be provided as an addendum to this QAPP and the standardization and QC criteria for the field parameters will be provided.

Assessment of field sampling precision and bias will be made by collecting field duplicates and field blanks for laboratory analysis. Collection of the samples will be in accordance with the applicable SOPs provided in the FSP.

B5.2 Laboratory Quality Control Checks

The EPA Region 7 ENSV Laboratory maintains a QC program to ensure the reliability and validity of the analysis performed at the laboratory. All analytical procedures are documented in writing as SOPs which include a QC section addressing the minimum QC requirements for the procedure. The internal QC checks differ slightly for each individual procedure, but, in general, the QC requirements may include some of the following information:

- Method blanks;
- Reagent/preparation blanks applicable to inorganic analysis;
- Instrument blanks;
- MS/MSDs;
- Surrogate spikes;
- Analytical spikes applicable to graphite furnace;
- Laboratory duplicates;
- Laboratory control standards;
- Internal standard areas for Gas Chromatograph/Mass Spectrophotometer (GC/MS) analysis;

- Mass tuning for GC/MS analysis;
- Endrin/DDT degradation checks for Gas Chromatograph/Electron Capture (GC/EC) analysis; and
- Second, dissimilar column confirmation for GC/EC analysis.

Laboratory-specific QC limits are available from the EPA Region 7 ENSV Laboratory. All data obtained will be properly recorded, and the final data package will be capable of allowing the recipient to reconstruct QC information and compare it to QC criteria as calculated in Section A7 of this QAPP. It is expected that sufficient volumes/weights of samples will be collected to allow for re-analysis, when necessary.

Corrective action in the laboratory may occur prior to, during, and after initial analyses. A number of conditions such as broken sample containers, multiple phases, low/high pH readings, potentially high concentration samples may be identified during sample log-in or just prior to analysis. Following consultation with laboratory analysts and section leaders, it may be necessary for the implementation of corrective action. These conditions may include dilution of samples, additional sample extract cleanup, and automatic re-injection/re-analysis when certain QC criteria are not met.

During analysis, the laboratory bench chemist may identify the need for corrective action. The laboratory QA Manager, in consultation with the staff, will approve the required corrective action to be implemented by the laboratory staff. The laboratory QA Officer will ensure implementation and documentation of the corrective action. If the nonconformance causes project objectives not to be achieved, it will be necessary to inform all levels of project management to concur with the corrective action, including the EPA WAM and the EPA QAC. TechLaw anticipates that, if necessary, these corrective actions will be performed prior to release of the data from the EPA Region 7 ENSV Laboratory. The corrective action will be documented in the laboratory corrective action log, will be signed by the analyst and the laboratory QA Manager, and the narrative data report will be sent to the EPA WAM. If corrective action does not rectify the situation, the laboratory will contact the EPA WAM.

B6 Instrument/Equipment Testing, Inspection, and Maintenance Requirements

B6.1 Field Preventative Maintenance

For this field event, TechLaw will only be collecting split samples and the use of field equipment by TechLaw is not required. However, any problems or deviations in preventative maintenance procedures by the AMCOM/USACE contractor observed by TechLaw will be noted.

B6.2 Laboratory Preventative Maintenance

Laboratory instruments are maintained in accordance with manufacturer's specifications and the applicable EPA Region 7 ENSV Laboratory SOPs.

B7 Instrument Calibration and Frequency

This section describes the calibration procedures and the frequency at which these procedures will be performed for both field and laboratory instruments.

B7.1 Field Instrument Calibration

At the current time, no field analytical procedures are anticipated for this project. If the EPA WAM directs TechLaw to perform field analytical procedures, the appropriate SOPs will be provided as an addendum to this QAPP, and field instruments will be calibrated as described in the instrument SOPs.

In the event that field instrumentation are required, instruments will be calibrated daily prior to use and will be re-calibrated every 10 samples. Specific instructions on the calibration frequency, the acceptance criteria, and the conditions that will require more frequent recalibration will be provided in the field instrument SOPs. The linearity of the instruments will be checked by using a two-point calibration with reference standards bracketing the expected measurement. All calibration procedures performed will be documented in the field logbook and will include the date/time of calibration, name of person performing the calibration, reference standard used, temperature at which readings were taken and the readings. Multiple readings on one sample or standard, as well as readings on replicate samples, will likewise be documented.

B7.2 Laboratory Instrument Calibration

Calibrations for laboratory analytical methods are summarized in applicable EPA Region 7 ENSV Laboratory SOPs. Calibration procedures for a specific laboratory

instrument will consist of initial calibrations, initial calibration verifications, and continuing calibration verification. The SOP for each analysis performed in the laboratory describes the calibration procedures, their frequency, acceptance criteria, and the conditions that will require recalibration. In all cases, the initial calibration will be verified using an independently-prepared calibration verification solution. The laboratory maintains a sample logbook for each instrument which will contain the following information: instrument identification, serial number, date of calibration, analyst, calibration solutions run and the samples associated with these calibrations.

B8 Inspection /Acceptance Requirements for Supplies and Consumables

Prior to sampling, the TechLaw Field Manager will ensure that a detailed equipment list is compiled. The TechLaw Field Manager will ensure that all field equipment is inspected and fit for use during the sampling event. This includes all consumable items including sample containers, reagents, among others.

The TechLaw Field Manager will inspect all containers to ensure that they are compatible with media to be sampled, are large enough in volume for the sample size, and have a resistance to breakage. Containers will be inspected to ensure that they will not distort, rupture, or leak as a result of chemical reactions with sample media. The containers will have adequate thickness to withstand handling during sample collection and transport to the laboratory. All consumable items will be present during the sampling event in sufficient quantities to support the sampling operations. Critical supplies, including reagents, standards, and deionized water will be provided by EPA Region 7 ENSV Laboratory.

B9 Data Acquisition Requirements (Non-Direct Measurements)

No non-direct measurements will be acquired for this project.

B10 Data Management

TechLaw will maintain all documents and files relevant to sampling and analysis activities as described in this QAPP. The data management scheme is provided in the field custody sequence and laboratory custody sequence provided in Figures B3.1 and B3.2, respectively. Complete records of all sampling will be maintained in the field logbook, and all laboratory

analytical records and notes will be submitted to TechLaw with the analytical data packages. All analytical data generated by EPA Region 7 ENSV Laboratory will be maintained using logbooks and data sheets, and computer-acquired data will be stored on computer hard drives, magnetic tape, or floppy disks.

All field logbooks, chain-of-custody copies, photographs, and film negatives will be kept in the possession of the TechLaw field team member until returning to the TechLaw Overland Park office. During the course of the project, all field information will be secured in the Overland Park office in the respective Field Team Member's office or in the office of the TechLaw WAM. Copies of all field logs, chain-of-custodies, and photograph logs will be included in the Sampling and Analysis Reports delivered to EPA, and the original documents, including film negatives, will be kept in the official project file which is managed by the TechLaw WAM.

The EPA Region 7 ENSV Laboratory will be responsible for internal checks on data reporting and will correct errors identified during quality assurance review. The EPA Region 7 ENSV Laboratory will be responsible for data validation, overall data management, and analysis of results. All organic and inorganic data generated for the project will be subjected to 100-percent data validation by the EPA Region 7 ENSV Laboratory concurrent with data management and statistical analysis, and data qualifiers defined in EPA guidelines will be applied, according to Section D of this QAPP. The EPA Regional Manager, the TechLaw WAM, and the TechLaw Project QAC (or designee) will be notified of any errors or loss of data during data reduction, data reporting, and data entry to forms, reports, and databases.

The TechLaw WAM will be the custodian of the documents and files and will ensure that they are secured in a limited access area in the TechLaw Overland Park office. At a minimum, the following documents and files will be kept for this work assignment:

- Field logbooks;
- Photographs of sampling activities;
- Drawings of sampling locations;
- Laboratory data packages;
- Data validation reports;
- Data assessment reports;
- Laboratory progress reports and QA reports; and
- All sample custody documentation.

All deliverables pertaining to this project, including Sampling and Analysis Reports and written correspondence to EPA, will be filed into TechLaw's ROC Document Control System.

DRAFT

Figure B3.1
Field Custody Sequence

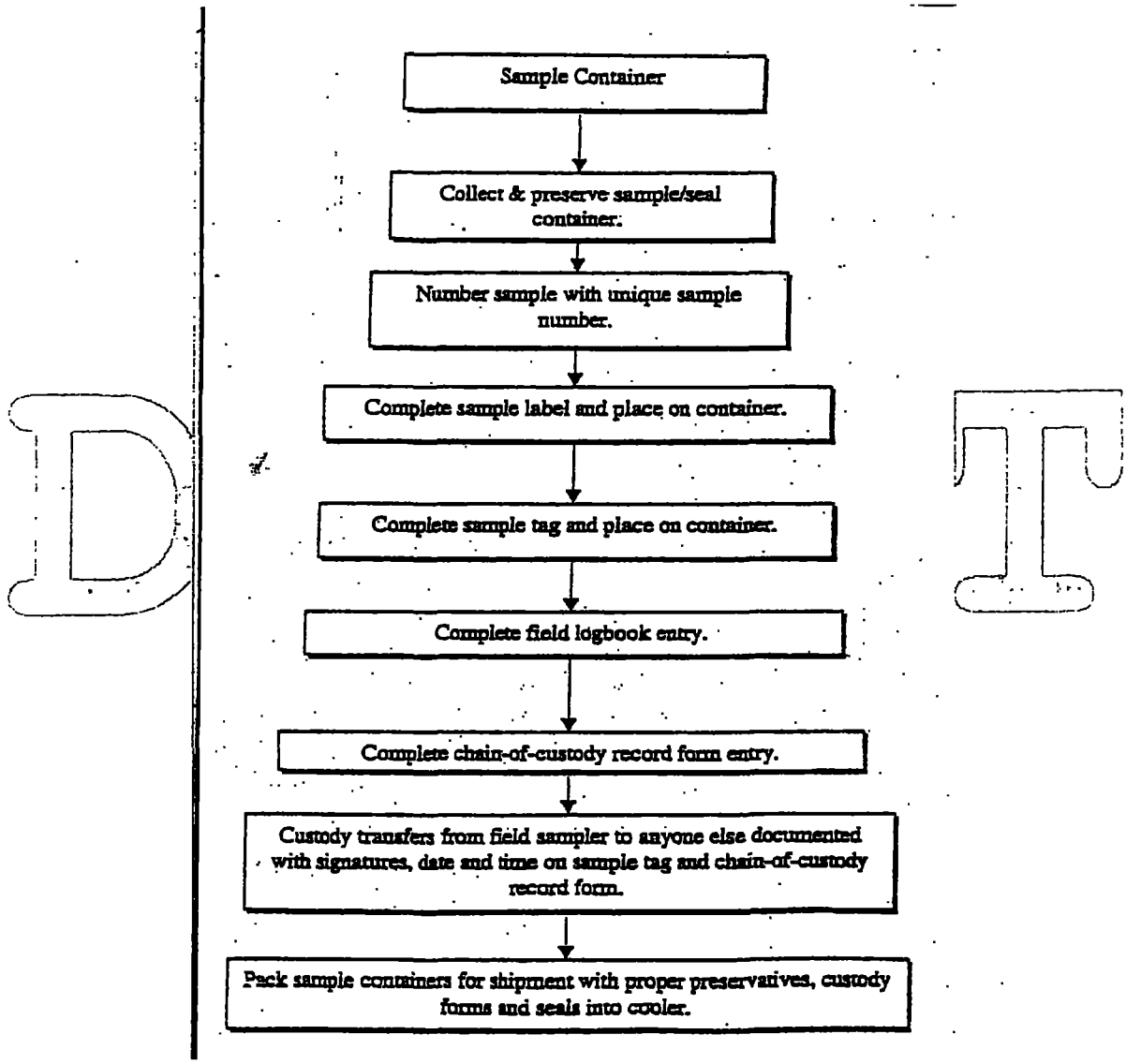


Figure B3.2
Laboratory Custody Sequence

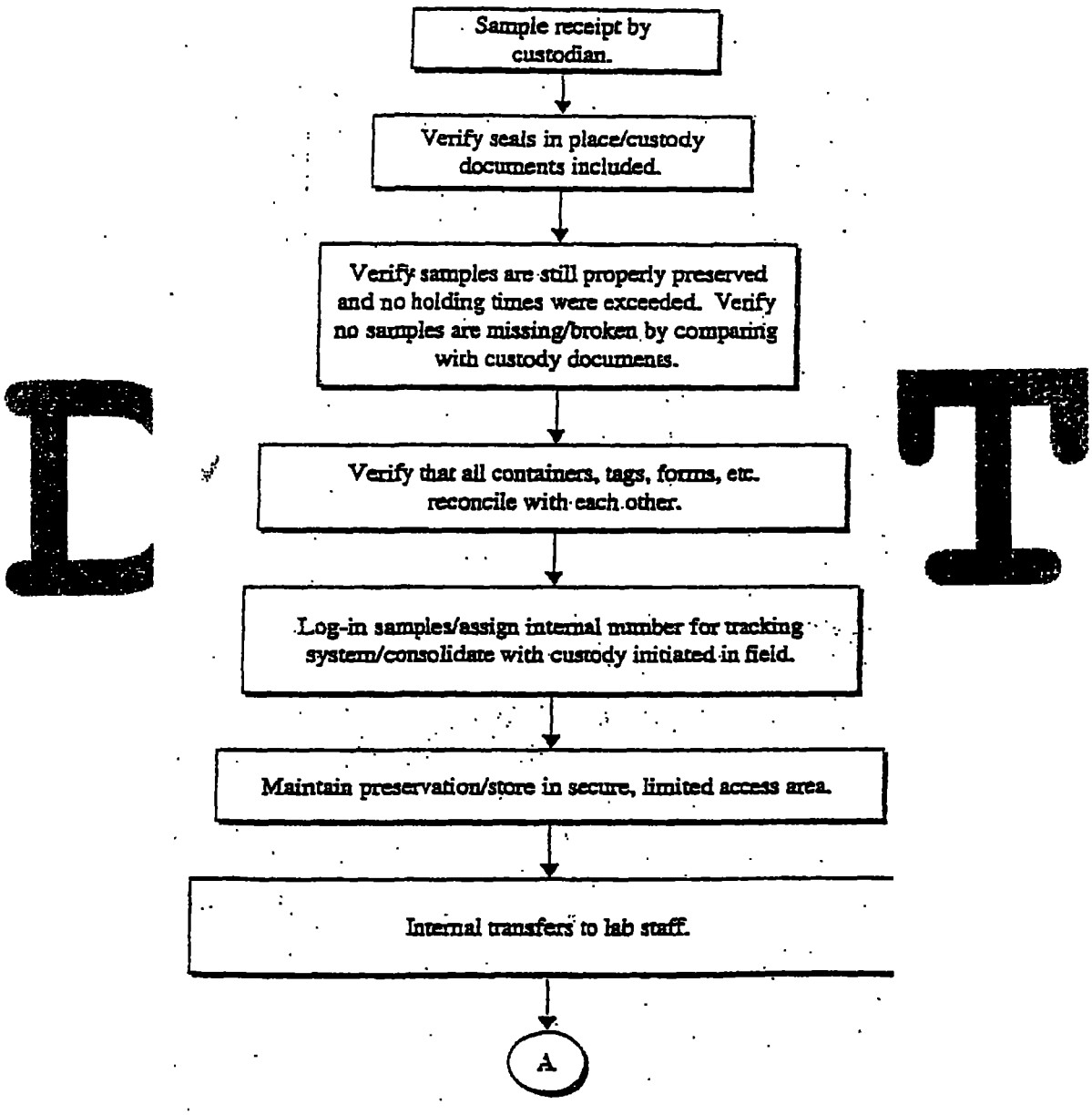


Figure B3.2
Laboratory Custody Sequence

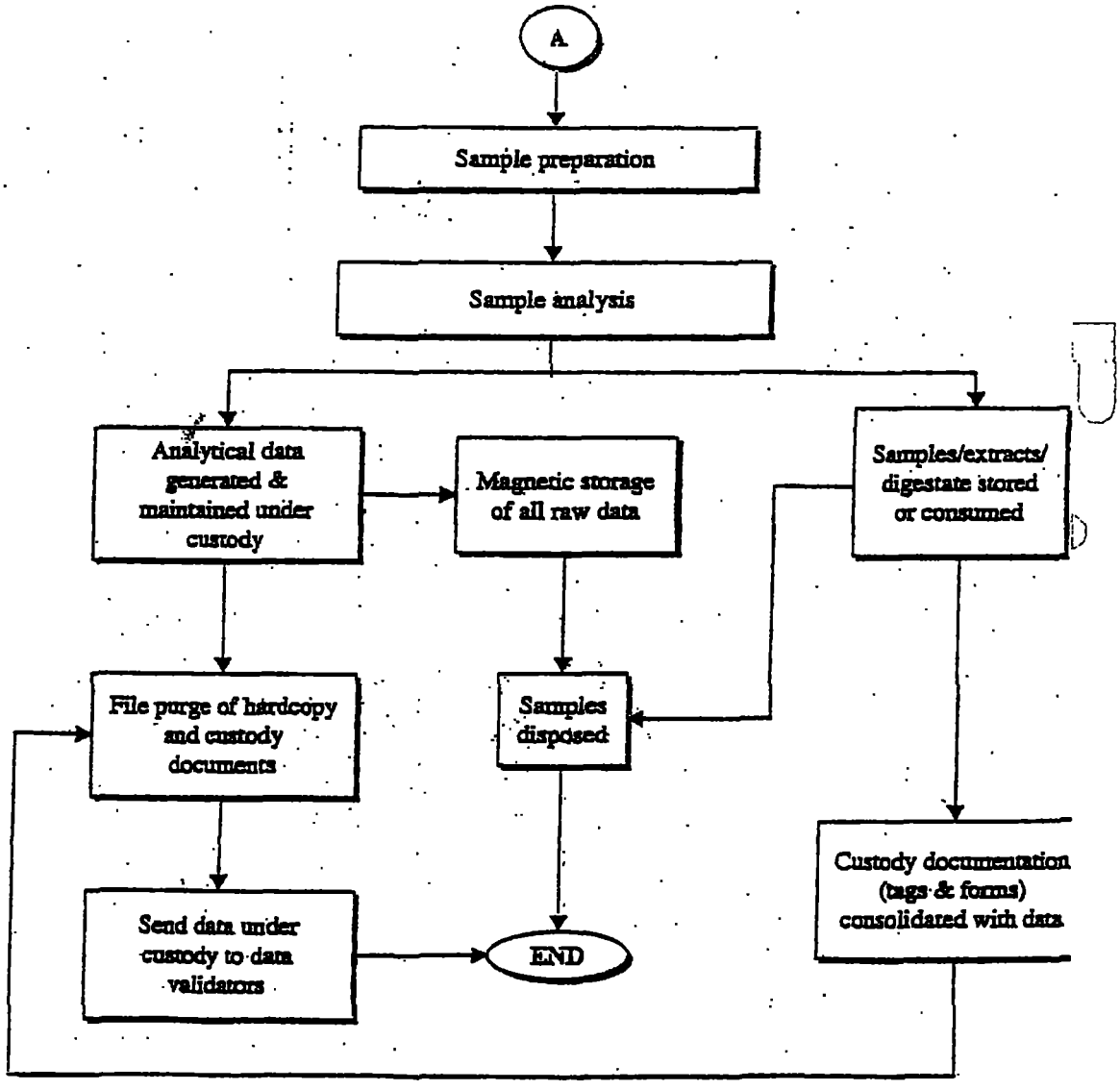


Figure B3.3
Sample Label

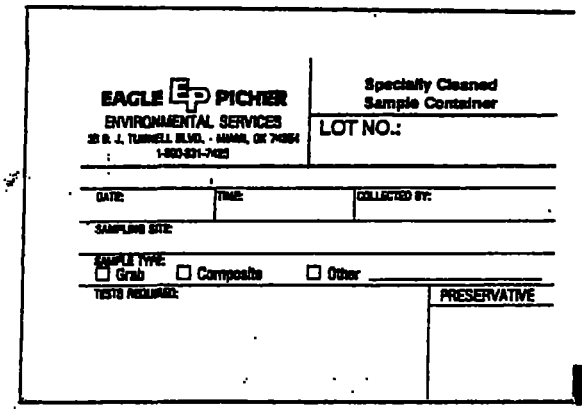


Figure B3.4
Sample Chain-of-Custody Record

TechLaw **Chain of Custody Record** TechLaw Inc.,

Project Code	Samples Shipped To	Samplers Names	1) Sample description (Enter in column A) 1. Surface Water 2. Ground Water 3. Leachate 4. Rinsate 5. Soil/Sediment 6. Oil 7. Waste 8. Other (specify)
Project (site) Name			2) Preservatives (Enter in colum 1. HCl 2. HNO_3 3. $Na\,HSO_4$ 4. H_2SO_4 5. NaOH 6. Other (specify 7. Ice only N. Not preserve
City, State, Zip Code	Carrier	Samplers Signatures	
Date Shipped	Air Bill Number		

Sample Identification Numbers	A. Matrix enter from Box 1	B. Preser. enter from Box 2	Grab or Comp	Number of Sample Containers	MM/DD/YY Time sample collection	Analysis											Remarks/ Tag Numbers

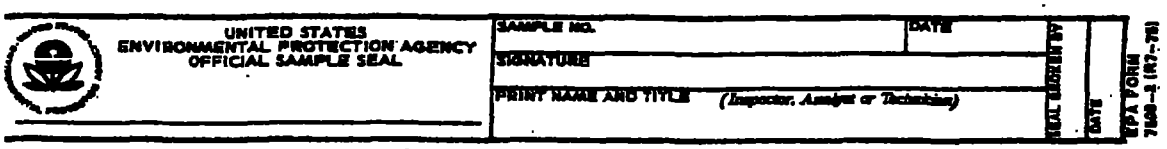
Relinquished By	Time	Date	Received By	Time	Date	Received By	Time	Date	Received By	Time	D
Relinquished By	Time	Date	Received By	Time	Date	Received By	Time	Date	Received By	Time	D

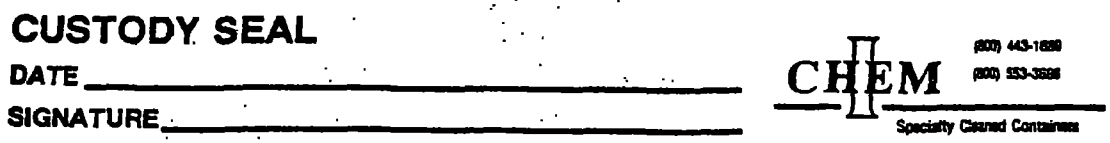
Remarks

Distribution: Original — TechLaw Inc.,
Carbon copies — Laboratory, work assignment manager, client (as appropriate)

Page ___ of _

Figure B3.5
Sample Custody Seal





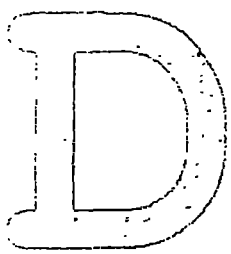
C ASSESSMENT/OVERSIGHT

C1 Assessments and Response Actions

Performance and system audits of both field and laboratory activities will be conducted to verify that sampling and analysis is performed in accordance with the procedures established in the FSP and the QAPP. The audits of field and laboratory activities include two independent parts: internal audits and external audits.

C1.1 Field Performance and System Audits

C1.1.1 Internal Field Audits



An internal audit may be undertaken by the TechLaw Project QAC after the initial sampling event at SLAAP. This audit may consist of an examination of field sampling records, sample handling and packaging, maintenance of QA procedures, and sample chain-of-custody procedures. The audit may be undertaken on all sampling records and sample coolers before the initial samples are delivered to EPA Region 7 ENSV Laboratory for analysis. Follow-up internal audits may be conducted to correct deficiencies, and to verify that QA procedures are maintained throughout the project.

C1.1.2 External Field Audits

External field audits may be conducted by the EPA WAM or the EPA Superfund QAC, or their designee. External field audits may be conducted any time during the field operations. These audits may or may not be announced and are at the discretion of EPA. The external field audit process can include a review of sampling equipment decontamination procedures, sample bottle preparation procedures, sampling procedures, examination of field sampling and safety plans, sample vessel cleanliness, QA procedures, and procedures for verification of field duplicates.

C1.2 Laboratory Performance and Systems Audits

C1.2.1 Internal Laboratory Audits

The laboratory for this sampling event will be the EPA Region 7 ENSV Laboratory. Therefore, TechLaw will not conduct any internal system audits of the analytical laboratory.

C1.2.2 External Laboratory Audits

An external audit may be conducted, as required, by appropriate EPA QA personnel. These audits may or may not be announced and are at the discretion of the EPA.

C1.3 Response Actions

Corrective action resulting from all audits will be implemented immediately if data may be adversely affected due to unapproved or improper use of approved methods. If corrective actions are insufficient, work may be stopped by the TechLaw WAM or the TechLaw Project QAC. If, at any time, a corrective action issue is identified which directly impacts project DQOs, the EPA WAM and/or the EPA QAC will be notified immediately by the TechLaw WAM or the TechLaw Project QAC.

Response actions will be undertaken to correct any deficiencies noted in any system and/or performance audit. All corrective action proposed and implemented will be documented in the regular QA reports to management. Corrective action should only be implemented after approval by the TechLaw Project QAC. If immediate corrective action is required, approvals secured by telephone from the TechLaw Project QAC should be documented in an additional memorandum to all project personnel. For noncompliance problems, a formal corrective action program will be determined and implemented at the time the problem is identified.

C2 Reports to Management

Project QA Reports will contain on a routine basis, all results of field and laboratory audits, all information generated during the past month reflecting on the achievement of specific DQOs, and a summary of corrective action that was implemented, and its immediate results

on the project. The status of the project with respect to the project schedule included in the QAPP will be determined. Whenever necessary, updates on training provided, changes in key personnel, anticipated problems in the field or laboratory for the coming month that could bear on data quality along with proposed solutions, will be reported. Detailed references to QAPP modifications will also be highlighted. All QA reports will be prepared in written, final format by the TechLaw WAM. To the extent possible, assessment of the project should also be performed on the basis of available QC data and overall results in relation to originally targeted objectives.

Project QA Reports will be prepared by TechLaw on a semi-annual basis and delivered to all personnel in the QAPP distribution list. In the event of an onsite emergency or the need for immediate corrective action, verbal QA reports can be made by telephone to the TechLaw Project QAC and the EPA WAM. In addition, updates of QA activities will be presented in the Monthly Work Assignment Status Report submitted to the EPA WAM.

D DATA VALIDATION AND USABILITY

All data generated through field activities or by the laboratory operation shall be reduced and validated (data validation will be performed by EPA Region 7 ENSV Laboratory prior to release of data to TechLaw) prior to reporting and submittal to EPA.

D1 Data Review, Validation, and Verification Requirements

All analytical results will be reviewed and validated by EPA Region 7 ENSV Laboratory according the applicable method detailed in *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, Third Edition* (June 1997) (SW-846) and applicable SOPs. The TechLaw Project QAC or his designee may perform an independent verification of all analytical data packages according to the EPA Contract Laboratory Procedures (CLP) National Functional Guidelines For Organic Data Review (October 1999), EPA CLP National Functional Guidelines For Inorganic Data Review (February 1994).

D2 Validation and Verification Methods

D2.1 Data Reduction

All field data will be written into field log books immediately after measurements are taken. If errors are made, results will be legibly crossed out, initialed and dated by the field member, and corrected in a space adjacent to the original entry. The TechLaw Field Manager or the TechLaw WAM, identified in Section A4 of this QAPP, will review the forms to determine whether any errors have been made by the field crew.

In general laboratory practice, all manually recorded analytical data will be recorded in numerically-identified laboratory notebooks. Data are recorded in this notebook along with other pertinent information, such as the sample identification number and the sample tag number. Other details will also be recorded in the laboratory notebook, such as the analytical method used, the laboratory SOP number, name of analyst, the date of analysis, matrix sampled, reagent concentrations, instrument settings, and the raw data. Each page of the notebook shall be signed and dated by the analyst. Periodic review of these notebooks by the laboratory QA Manager takes place prior to final data reporting, with records of notebook entry inspections being maintained by the laboratory QA Manager. In addition to laboratory notebooks, all instrument software printouts will be kept on file by the laboratory.

For this project, the equations that will be employed in reducing data make pertinent allowances for matrix type. All calculations are checked by the laboratory QA Manager at the conclusion of each operating day. Errors are noted, corrections are made, but the original notations are crossed out legibly. Analytical results for soil samples shall be calculated and reported on a dry weight basis. All QC data (e.g., laboratory duplicates, surrogates, MS/MSDs) will be compared to the method acceptance criteria and/or laboratory limits. Data considered to be acceptable will be reported by the laboratory. Unacceptable data shall be appropriately qualified in the project report. Case narratives will be prepared which will include information concerning data that fell outside acceptance limits, and any other anomalous conditions encountered during sample analysis. After the laboratory data are approved, they are considered ready for data validation.

D2.2 Data Validation

Field data validation includes checking for transcription errors and reviewing field logs for compliance with this QAPP. This task will be the responsibility of the TechLaw Field Manager, who will otherwise not participate in making any of the field measurements, or in adding notes, data, or other information to the log book.

Laboratory data review and validation will be undertaken by EPA Region 7 ENSV Laboratory to ensure that the project DQOs are met. This review will address the following: technical holding times, instrument performance check sample results, results of initial and continuing calibration, and results of surrogate spikes, MS/MSDs, laboratory control samples, and target compound identification and quantitation results. One hundred percent of the analytical results will be validated.

D2.3 Data Reporting

Field data reporting shall be conducted principally through the transmission of field logs and any report sheets containing tabulated results of all measurements made in the field.

Laboratory data reporting will be performed through the transmission of case narratives and chemistry data packages from EPA Region 7 ENSV Laboratory to TechLaw. The analytical data packages submitted to TechLaw will include the following:

Case Narrative

I. Date of issuance
ii. Laboratory analysis performed
iii. Any deviations from intended analytical strategy
iv. Laboratory batch number
iv. Numbers of samples and respective matrices
v. QC procedures utilized and also references to the acceptance criteria
vi. Laboratory report contents
vii. Project name and number
viii. Condition of samples 'as-received'
ix. Discussion of whether or not sample holding times were met
x. Discussion of technical problems or other observations which may have created analytical difficulties
xi. Discussion of any laboratory QC checks which failed to meet project criteria
xii. Signature of the appropriate manager

Chemistry Data Package

I. Case narrative for each analyzed batch of samples
ii. Summary page indicating dates of analyses for samples and laboratory quality control checks
iii. Cross referencing of laboratory sample to project sample identification numbers
iv. Data qualifiers to be used should be adequately described
v. Sample preparation and analyses for samples
vi. Sample results
vii. Raw data for sample results and laboratory quality control samples
viii. Results of (dated) initial and continuing calibration checks, and GC/MS tuning results
ix. MS/MSD recoveries, LCS recoveries, method blank results, calibration check compounds, and system performance check compound results
x. Labeled (and dated) chromatograms/spectra of sample results and laboratory quality control checks
xi. Results of tentatively identified compounds

The data package submitted to TechLaw will be in CLP forms or equivalent. Following the receipt of the data package from the laboratory, the TechLaw Project QAC or his designee may perform an independent review of the results.

D3 Reconciliation With User Requirements

The TechLaw WAM, EPA and TechLaw Project QAC (or designee) will determine whether the data are of the appropriate quality, quantity and representativeness to support the project objectives. The affect of the loss of data deemed unacceptable for use, for whatever reason, on the project objectives will be discussed between the TechLaw Project QAC and the TechLaw WAM. Only data generated in association with QC results meeting these objectives will be considered useable for decision making purposes. In addition, the data obtained will be both qualitatively and quantitatively assessed on a project-wide, matrix-specific, parameter-specific and unit-specific basis. This assessment will be performed by the TechLaw Project QAC and the TechLaw WAM, and the results presented and discussed in detail in each Sampling and Analysis Report. Factors to be considered in this assessment of field and laboratory data will include, but not necessarily be limited to, the following:

- Were all samples obtained using the methodologies and standard/approved procedures;
- Were all proposed analyses performed according to standard/approved procedures;
- Were samples obtained from all proposed sampling locations and depths;
- Do any analytical results exhibit elevated detection limits due to matrix interferences or contaminants present at high concentrations;
- Were all field and laboratory data validated according to the validation protocols, including standard/approved procedures;
- Which data sets were found to be unusable (qualified as "R") based on the data validation results;
- Which data sets were found to be usable for limited purposes (qualified as "J") based on the data validation results;
- What affect do qualifiers applied as a result of data validation have on the ability to implement the project decision rules;
- Can valid conclusions be drawn for all matrices at each unit and/or area under investigation;
- Were all issues requiring corrective action, as presented in the monthly QA Reports to management fully resolved;

- Were the project-specific decision rules used as proposed during the actual investigation;
- For any cases where the proposed procedures and/or requirements have not been met, has the affect of these issues on the project objectives been evaluated;
- Have any remaining data gaps been identified and summarized in the final Sampling and Analysis Report; and
- Based on the overall findings of the investigation and this assessment, were the original project objectives appropriately defined and, if not, have revised project objectives been developed.

Corrective action may be needed during either the data validation or data assessment. Potential types of corrective action may include re-sampling by the field team or re-injection/re-analysis of samples by the laboratory. These actions are dependent upon the ability to mobilize the field team, whether the data to be collected is necessary to meet the required QA objectives (e.g., the holding time for samples is not exceeded). If the TechLaw Project QAC identifies a corrective action situation, the TechLaw WAM will be responsible for approving the implementation of corrective action, including re-sampling, during data assessment. All corrective actions of this type will be documented by the TechLaw Project QAC and the TechLaw WAM.

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Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, Third Edition. June 1997.

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U.S. EPA. Contract Laboratory Program National Functional Guidelines For Organic Data Review. October 1999.

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